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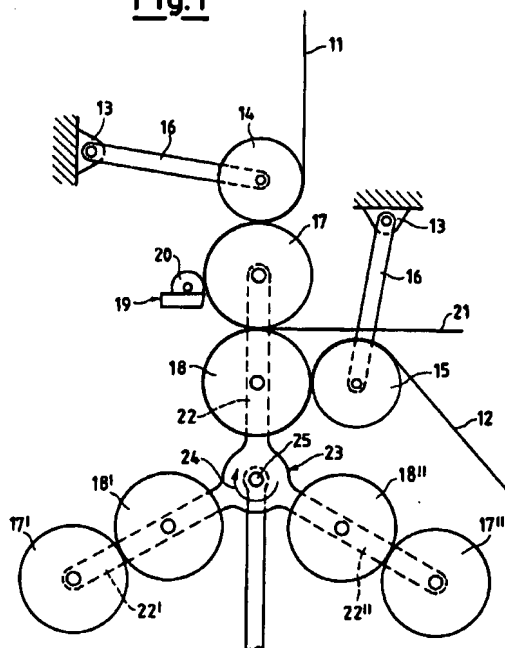
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(54) **Convertible machine for surface treatment of paper**

(57) A convertible machine for surface treatment of paper, in particular of toilet paper, absorbent wipes, tow-elettes, serviettes, handkerchiefs and the like, comprising, on a roll stand (13), at least one pair of cylinders, one of which (14, 15) is rubber-coated and the other (17, 18) is made of steel, in contact with one another and between which at least one ribbon of paper (11, 12) is made to pass to be subjected to surface treatment, the steel cylinder (17, 18) being set on a support (23) displaceable from a position of contact with the rubber-coated cylinder (14, 15) and carrying at least one further steel cylinder (17', 18' and 17'', 18'') to be brought into contact with the rubber-coated cylinder (14, 15).

Fig.1



EP 1 074 382 A1

Description

[0001] The present invention refers to a convertible machine for surface treatment of paper.

[0002] In the sector of surface treatment of paper, in particular of paper that is subsequently used as toilet paper, absorbent wipes, towelettes, serviettes, handkerchiefs and the like, it is by now customary to make surfaces of the paper provided with various decorations.

[0003] These surface decorations are made using different methods; namely, causing pairs of embossing cylinders to interact on a single ribbon or two ribbons of paper which are joined together, where the cylinders are provided with appropriate machinings.

[0004] The normal procedure envisages, in fact, that the two ribbons of paper are initially sent to be wound on a corresponding rubber-coated cylinder for guiding them towards the embossing area. This rubber-coated cylinder also constitutes an element of contrast with a respective steel cylinder forming part of the pair that subsequently makes the final paper consisting of one or more ribbons laid on top of one another and joined together, provided with surface decorations. It is then known that, in the presence of the two pairs of steel cylinders and of the respective pair of rubber-coated cylinders, there may possibly be associated a device for dispensing glue, which inserts glue between the two ribbons of paper.

[0005] The decorations made on the two ribbons are used to obtain a product having a particular appearance required by the specific customer.

[0006] The need thus arises for having available pairs of steel cylinders bearing decorations having different patterns according to the batches of finished paper product that the various customers may request.

[0007] In the processing machine it is therefore necessary to provide for replacement of the steel cylinder or pair of steel cylinders bearing a certain pattern with another cylinder or pair of cylinders bearing another pattern. The said replacement involves operations of disassembly of the unit being used and or re-assembly of the unit required by the second treatment process.

[0008] These operations determine a loss of time for disassembly and assembly, as well as operations for adjusting the new pairs of steel-to-steel cylinders which have been installed.

[0009] A purpose of the present invention is to provide a machine for surface treatment of paper, in particular in the sector of surface treatment of paper, such as toilet paper, absorbent wipes, towelettes, serviettes, handkerchiefs and the like, which enables the problem of disassembly and/or assembly of the steel cylinders to be avoided in the event of variation of the pattern.

[0010] Another purpose of the present invention is to make available a machine that simply enables fast replacement of one steel cylinder or of a pair of steel cylinders that are worn out, with another new cylinder or

pair of new cylinders.

[0011] These purposes according to the present invention are achieved by providing a convertible machine for surface treatment of paper, as specified in Claim 1. Further characteristics are specified in the subsequent claims.

[0012] The characteristics and advantages of a convertible machine for surface treatment of paper will emerge more clearly evident from the ensuing description, which is provided purely to furnish an explanatory and non-limiting example, with reference to the attached schematic drawings in which:

Figure 1 is a schematic elevation of a first arrangement made according to the present invention; Figure 2 is an elevation of a second arrangement exemplifying the present invention; and Figure 3 is an elevation of a third arrangement exemplifying the present invention. With reference to Figure 1, a central part of a convertible machine for surface treatment of paper is shown during the phase of treatment of a pair of ribbons 11 and 12, which arrive from respective rolls (not shown).

[0013] The machine carries on a roll stand, designated in some of its parts as 13, pairs of arrangements, such as those illustrated in the figure, for supporting the ends of the cylinders making it up. For reasons of simplicity, reference is therefore made in the description to a single side.

[0014] The roll stand thus comprises a first rubber-coated cylinder 14, and a second rubber-coated cylinder 15, which, according to the invention may be displaced since they are, for instance, supported on levers 16.

[0015] Operatively associated to these two rubber-coated cylinders 14 and 15 are two steel cylinders 17 and 18 which present their machined surfaces, for example surfaces provided with projecting areas made by machining, for instance milling with a hob or knurling tool, or the turning tool of a lathe, and in general by removal of stock, or by chemical etching.

[0016] In addition, to one of these steel cylinders, for example the one designated by 17 in this arrangement shown to provide an example, is associated a glue-distributing assembly 19 which, by means of a roller 20, dispenses a metered quantity of glue on a surface of the ribbon 11 which will come into contact with the corresponding surface of the ribbon 12. In this case, it is possible to say that the two surfaces are the internal ones, the two ribbons glued together then constituting the finished ribbon of paper 21. The glue-dispensing assembly 19 may also be a simple dispensing nozzle or any other type of device.

[0017] According to the present invention, moreover, the pair of cylinders 17 and 18 is positioned on a first arm 22 of a rotating support 23, which rotates about a central axis 25, carrying a number of pairs of steel cyl-

inders. In the example of embodiment, which is a non-limiting example, three arms 22, 22' and 22" are provided, which carry pairs of cylinders 17, 18; 17', 18'; and 17", 18".

[0018] In this way, in the operative arrangement shown, two pairs of cylinders, one pair 14, 17 rubber-coated, and the other pair 15, 18 made of steel, are provided, in which the rubber-coated cylinder 14, 15 has the function of a contrasting element co-operating with the respective steel cylinder 17, 18, to impress the desired pattern on the respective ribbon of paper 11, 12.

[0019] The parts in relief of the pattern of the ribbon of paper 11 then receive the glue before coming into contact with one another and being stuck together, precisely in the areas where the said embossed areas are present.

[0020] This type of treatment does not involve any problem until the need arises to obtain a different pattern on the finished paper.

[0021] According to the invention, the two cylinders 14 and 15 are moved away from one another by oscillating the levers 16 by means of actuators (not shown), and the glue-dispensing unit 19 is likewise moved away. Then, a further actuator (not shown) is used to rotate the rotating support 23, for instance according to the arrow 24, so as to disengage the pair of cylinders 17 and 18 from the area of operation.

[0022] This rotation enables the second arm 22' to bring a new pair of cylinders 17' and 18' into the area of operation, said cylinders, for instance, being provided with a different surface pattern. Once this has been done, the two cylinders 14 and 15 are brought back into contact with the cylinders 17' and 18' by oscillating the arms 16 in a direction opposite to the previous direction. The glue-dispensing unit 19 is then brought back into its former position, and the ribbons of paper 11 and 12 are once again introduced into the machine.

[0023] The machine is now ready to perform a new operation of formation of the paper 21 having the new surface pattern.

[0024] The particular structure of the machine according to the present invention thus enables maximum operativeness with minimum stoppage time, so eliminating operations of assembly and disassembly or, at least, reducing them to the minimum.

[0025] This particular machine is also able to eliminate the down time due to the mere replacement of the steel cylinders when the latter are worn out or deteriorated owing to use. It is in fact also possible to position a number of pairs of cylinders of the same type on the rotating support 23 so as to obtain extremely reduced replacement times.

[0026] This is a machine which, in the sector of surface treatment of paper, in particular of toilet paper, absorbent paper, serviettes, handkerchiefs and the like, that involves high amounts of paper to be treated, is extremely effective and useful, capable of solving the problem of time due to stoppages and down time due to

operations of assembly and disassembly.

[0027] It is evident that the example outlined is only one of the possible embodiments, it being moreover clear that similar arrangements which use the same new and original principle are to be considered included in the sphere of protection of the present invention.

[0028] In this connection, Figure 2 shows a simplified form of the arrangement of Figure 1, in which the same reference numbers are used for corresponding parts.

[0029] It may thus be noted that in this case only one ribbon 11 is fed in, which arrives from a roll (not shown) and which is first wound at least partially on a rubber-coated cylinder 14 located so that it can be displaced on a lever 16 pivoted to the roll stand 13.

[0030] Also in this example, the machine is equipped with a rotating support 23 bearing arms 22, 22', 22", which each carry a steel cylinder 17, 17', 17" provided with surface machining or the like, such as a knurled surface.

[0031] The ribbon 21 which comes out and which is passed between the rubber-coated cylinder 14 and the steel cylinder 17 is the finished ribbon provided with a given surface treatment.

[0032] In the case where it is intended to apply a different surface treatment, it is sufficient to rotate the support 23 and to bring a second steel cylinder 17', with a different surface machining, or else a new steel cylinder for replacement of the old cylinder that is worn out, into contact with the rubber-coated cylinder 14.

[0033] Figure 3 illustrates a machine in which the parts are differently arranged and which is an application of the same innovative idea. Also in this case, the same reference numbers are used for corresponding parts or parts having the same function.

[0034] In fact, the pairs of cylinders that are brought into contact with the rubber-coated cylinders 14 and 15 are arranged in box-like supports 22, 22', 22". These box-like supports 22, 22', 22" can be translated and can slide on a roll stand 23 equipped with a supporting track 26 fixed to the roll stand 13.

[0035] The box-like supports 22, 22', 22" may be brought into contact with, and removed from contact with, the rubber-coated cylinders 14 and 15 by translating on the supporting track 23 of the roll stand 13. For this displacement, known actuators (not shown) are provided. Each of the box-like supports contains at least one steel cylinder or, as shown in Figure 3, pairs of steel cylinders 17, 18; 17', 18'; and 17", 18".

[0036] Thus obtained in an equivalent way is the replacement and change of the pairs of steel cylinders 17, 18; 17', 18'; and 17", 18", as for the example illustrated in Figure 1, with another type of support that does not rotate but translates.

[0037] In any case, further modes of solution may be identified, all of which fall within the same innovative idea of the present invention.

Claims

1. A convertible machine for surface treatment of paper, in particular of toilet paper, absorbent wipes, towlettes, serviettes, handkerchiefs and the like, comprising, on a roll stand (13), at least one pair of cylinders, one of which (14, 15) is rubber-coated and the other (17, 18) is made of steel, in contact with one another and between which at least one ribbon of paper (11, 12) is made to pass to be subjected to surface treatment, characterized in that said steel cylinder (17, 18) is set on a support (23) displaceable from a position of contact with said rubber-coated cylinder (14, 15) and carries at least one further steel cylinder (17', 18' and 17'', 18'') to be brought into contact with said rubber-coated cylinder (14, 15). 5

2. A machine according to Claim 1, characterized in that it has a pair of steel cylinders (17, 18) in contact with one another, and in turn each in contact with a respective rubber-coated cylinder (14, 15), said rubber-coated cylinders (14, 15) guiding a pair of paper ribbons (11, 12) between said pair of steel cylinders (17, 18) after at least one of said ribbons (11, 12) has received, on one of its surfaces designed to be brought into contact with the other ribbon, an adhesive dispensed by a glue-dispensing unit (19), said pair of steel cylinders (17, 18) set on said support (23) carrying at least one second pair of steel cylinders (17', 18'; 17'', 18'') that may be associated to the respective rubber-coated cylinder (14, 15). 10
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3. A machine according to Claim 1 or Claim 2, characterized in that said support (23) on which at least said steel cylinder (17, 18) is set is a rotating support. 35

4. A machine according to Claim 1 or Claim 2, characterized in that said support (23) on which at least said steel cylinder (17, 18) is set is a translatable and sliding support. 40

5. A machine according to Claim 2, characterized in that said each rubber-coated cylinder (14, 15) may be disengaged from a respective steel cylinder (17, 18'; 17'', 18''). 45

6. A machine according to Claim 1, characterized in that said each rubber-coated cylinder (14, 15) is set on an oscillating lever (16). 50

7. A machine according to Claim 3, characterized in that said rotating support (23) consists of at least two arms (22, 22', 22'') rotating about a central axis (25). 55

8. A machine according to Claim 4, characterized in that said translatable and sliding support consists of a box-like structure (22, 22', 22'') translatable and sliding on a roll stand (13) equipped with a supporting track (26).

9. A machine according to Claim 8, characterized in that said box-like structure (22, 22', 22'') comprises at least one pair of steel cylinders (17, 18; 17', 18'; 17'', 18'') to be brought into contact with said rubber-coated cylinders (14, 15).

Fig.1

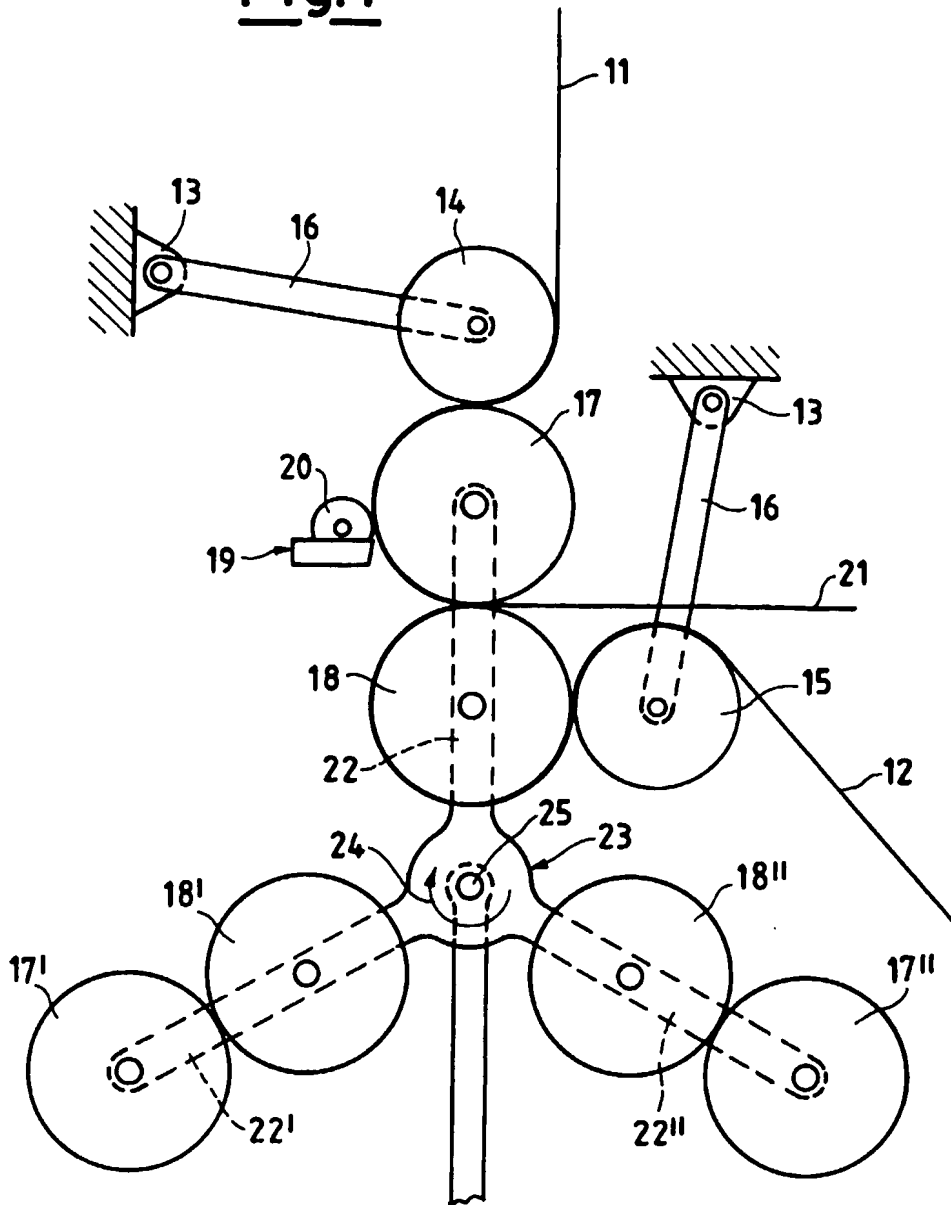


Fig.2

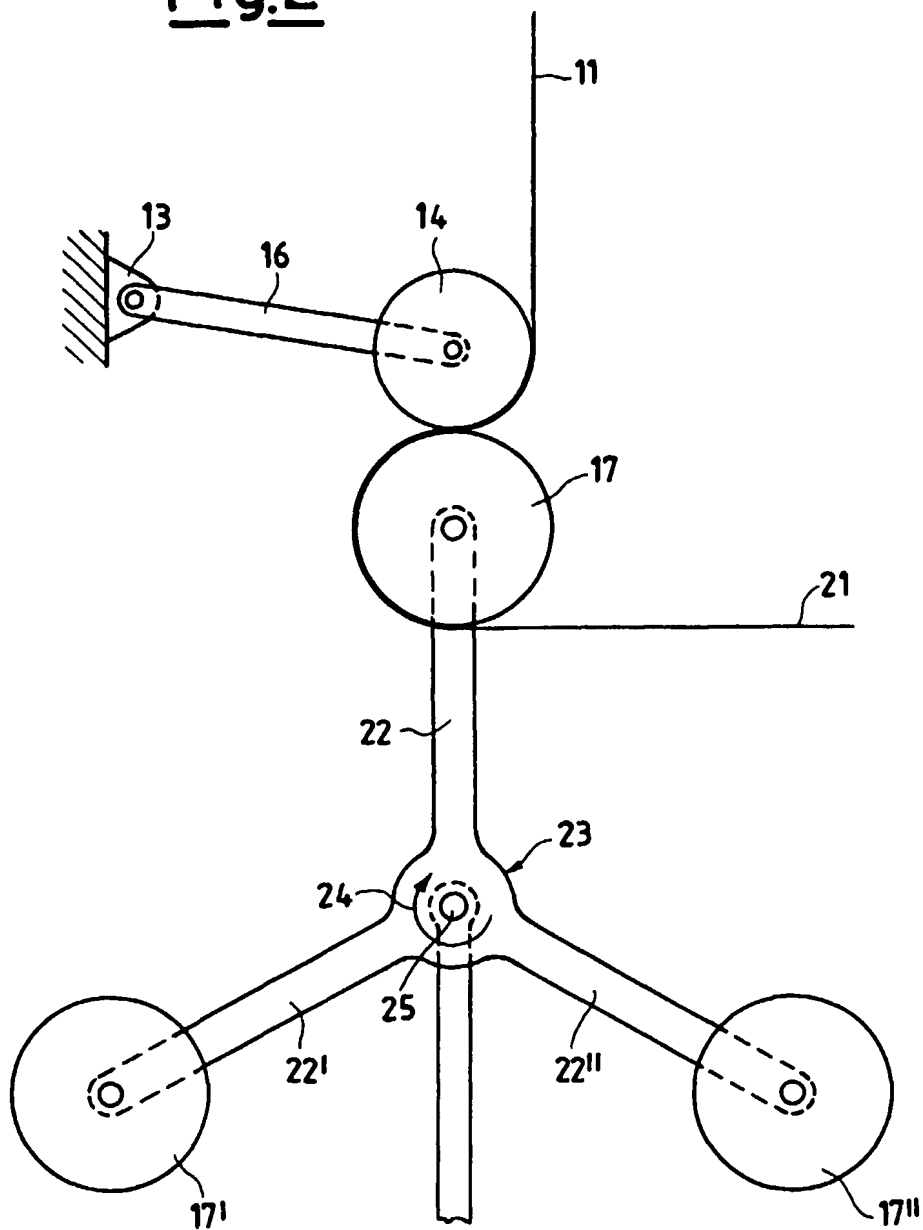
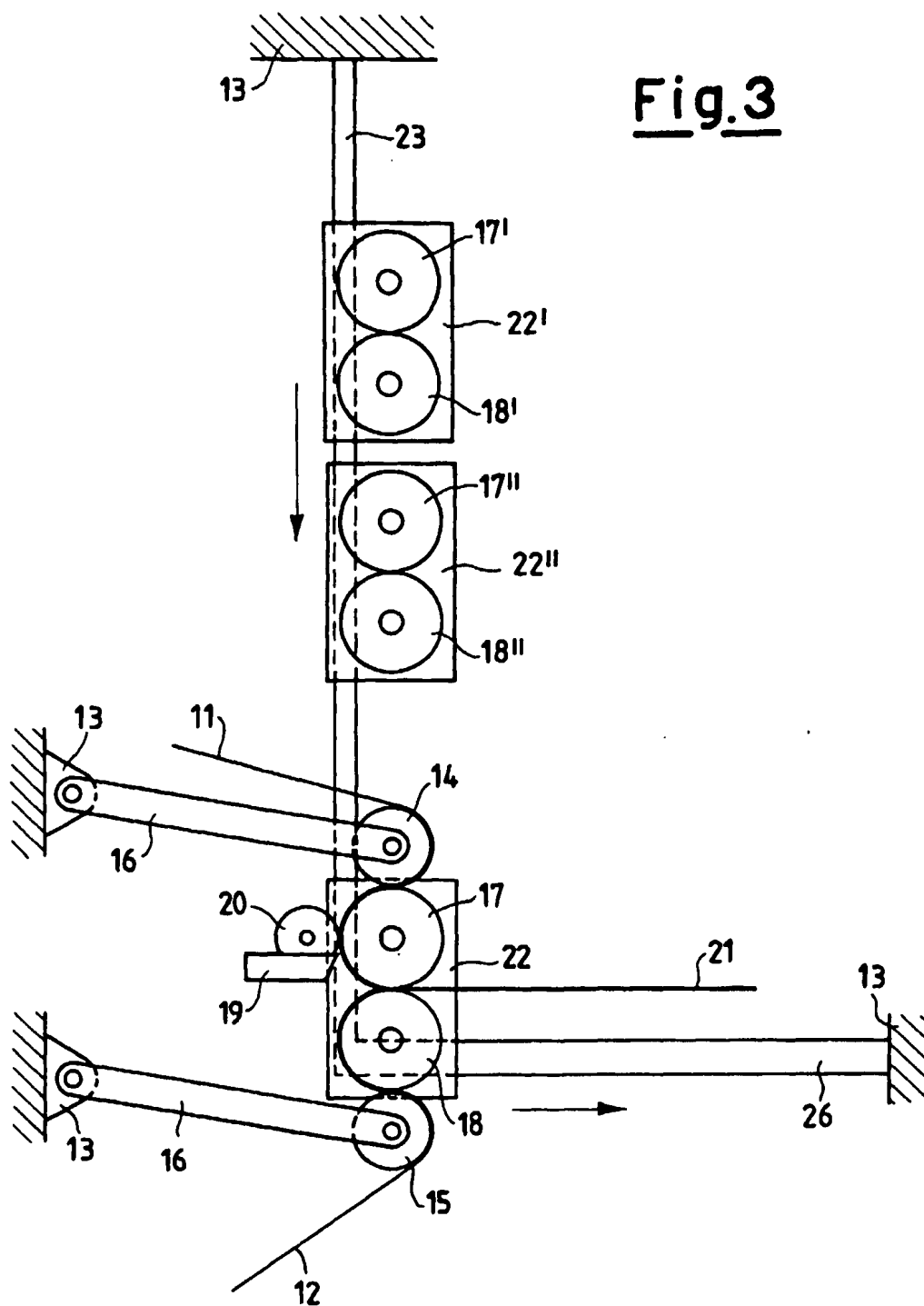


Fig.3



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EUROPEAN SEARCH REPORT

Application Number
EP 00 20 2744

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)	
Y	DE 44 12 862 C (BERSTORFF GMBH MASCH HERMANN) 10 August 1995 (1995-08-10) * figure 1 *	1-3	B31F1/07	
A	* the whole document *	4-9		
P,Y	WO 99 44814 A (BIAGIOTTI GUGLIELMO ;PERINI FABIO SPA (IT)) 10 September 1999 (1999-09-10) * figures *	1,2		
P,Y	US 6 053 232 A (FABIO PERINI S.P.A.) 25 April 2000 (2000-04-25) * column 3, line 65 - column 4, line 35 *	1-3		
Y	EP 0 265 298 A (BEGHIN SAY SA) 27 April 1988 (1988-04-27) * figure 1 *	1,2		
A	US 5 686 168 A (LAURENT PIERRE ET AL) 11 November 1997 (1997-11-11) * column 4, line 3 - line 21 *	1-9		TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	DE 297 12 743 U (MASCHINENFABRIK GOEBEL GMBH) 30 October 1997 (1997-10-30) * figure 1 *	1		B31F
A	EP 0 112 981 A (SCHLOEMANN SIEMAG AG) 11 July 1984 (1984-07-11) * the whole document *	8		
A	EP 0 908 246 A (KVAERNER METALS CLECIM) 14 April 1999 (1999-04-14)			
A	DE 35 06 423 C (HERMANN BERSTORF MASCHINENBAU GMBH) 10 April 1986 (1986-04-10)			
The present search report has been drawn up for all claims				
Place of search MUNICH		Date of completion of the search 31 August 2000	Examiner Naeslund, P	
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Application Number
EP 00 20 2744

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 44 13 807 C (WINDMOELLER & HOELSCHER) 14 September 1995 (1995-09-14) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 31 August 2000	Examiner Naeslund, P
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 2744

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31-08-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4412862 C	10-08-1995	JP 8039595 A	13-02-1996
WO 9944814 A	10-09-1999	IT FI980046 A	02-09-1999
		IT FI980139 A	10-12-1999
		AU 3273499 A	20-09-1999
US 6053232 A	25-04-2000	IT FI950249 A	05-06-1997
		AT 185515 T	15-10-1999
		AU 1108397 A	27-06-1997
		BR 9611684 A	02-03-1999
		CA 2239373 A	12-06-1997
		CN 1203549 A	30-12-1998
		DE 69604696 D	18-11-1999
		DE 69604696 T	21-06-2000
		EP 0868301 A	07-10-1998
		ES 2138391 T	01-01-2000
		WO 9720687 A	12-06-1997
		JP 2000501348 T	08-02-2000
		PL 327327 A	07-12-1998
EP 0265298 A	27-04-1988	FR 2604734 A	08-04-1988
		AT 62290 T	15-04-1991
		CA 1299079 A	21-04-1992
		DE 3769072 D	08-05-1991
		GR 3001718 T	23-11-1992
		US 4978565 A	18-12-1990
US 5686168 A	11-11-1997	FR 2700496 A	22-07-1994
		AT 169862 T	15-09-1998
		DE 69412585 D	24-09-1998
		DE 69412585 T	07-01-1999
		EP 0679122 A	02-11-1995
		ES 2121186 T	16-11-1998
		WO 9415776 A	21-07-1994
DE 29712743 U	18-09-1997	NONE	
EP 0112981 A	11-07-1984	DE 3244200 A	30-05-1984
		AT 46638 T	15-10-1989
		DE 3380622 D	02-11-1989
		JP 1590397 C	30-11-1990
		JP 2016164 B	16-04-1990
		JP 59107709 A	22-06-1984
		SU 1179910 A	15-09-1985
		US 4510783 A	16-04-1985

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 00 20 2744

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

31-08-2000

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0908246 A	14-04-1999	FR 2769525 A	16-04-1999
		CA 2250498 A	10-04-1999
		US 6098439 A	08-08-2000
DE 3506423 C	10-04-1986	CN 86100345 A,B	24-09-1986
		FR 2577845 A	29-08-1986
		GB 2172961 A,B	01-10-1986
		IT 1188271 B	07-01-1988
		JP 61195814 A	30-08-1986
		US 4649631 A	17-03-1987
DE 4413807 C	14-09-1995	AT 33995 A	15-08-2000
		BR 9501731 A	14-11-1995
		CN 1116585 A	14-02-1996
		ES 2120851 A	01-11-1998
		FR 2718995 A	27-10-1995
		GB 2288570 A,B	25-10-1995
		IT BZ950020 A	20-10-1995
		JP 7290691 A	07-11-1995
		US 5549044 A	27-08-1996

EPO FORM P4459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82